

STORAGE WATER HEATER HORIZONTAL U-TUBE TYPE



Sectional view of Welded Storage Heater showing Element

Health, Comfort or Production Efficiency Depend Upon the Correct Storage Water Heater

Hot water is a vital necessity today in the efficient operation of all kinds of public buildings and manufacturing plants. The comfort of tenants or guests, the health of patients, the safety of employees and the quality of product all depend upon a continuous, clean and ample supply of hot water. A storage water heater of proper size, designed for an economical balance between peak demand and steam generating capacity can be depended upon to maintain an adequate hot water supply in industrial plants, office buildings, apartments, clubs, banks, institutions, schools, colleges, laundries, dairies, breweries, restaurants and other buildings.

Method of Heater Operation

Where steam is available, water may be heated by passing the steam through tubes immersed in a tank through which water passes. The general construction is illustrated in the above cut.

The storage water heater is proportioned to heat and store water during periods of low demand so that an ample supply is available for all periods of greater consumption. This flexible ratio between heating and storage capacity distributes the steam demand and thereby reduces the boiler capacity required to the most economical proportions.

Variations in Hot Water Requirements Need Careful Study

The consumption of hot water in different types of buildings varies widely and careful

analysis of the amount required under all conditions is of great importance in determining the most practical size of storage tank and heating element.

The average hot water requirements as derived from the available tables can serve only as approximate guides, since they represent average conditions and must be corrected for unusual requirements.

An analysis of hot water requirements should include determination of the maximum hourly demand, the average hourly demand and the period of maximum demand.

Having determined these factors, the combination of storage tank and heating element becomes dependent upon the steam supply available. If it is small and uniform, the storage tank should be relatively large compared to the heating element capacity. If, on the other hand, there is an unlimited supply of steam available and it is only necessary to supply storage to take care of sudden drafts, the ratio of storage tank to heating element may be smaller.

It can readily be seen that each installation requires individual study and careful analysis for operating economy.

Consult a Competent Engineer

It is well to engage the services of a competent heating and ventilating engineer whose business it is to analyze hot water needs and from a consideration of all hot water requirements, to determine the most economical tank and element.

STORAGE WATER HEATER-HORIZONTAL U-TUBE TYPE

Available in Various Sizes

The ADSCO Storage Water Heater is supplied with copper U-tube heating element to transfer heat from either live, exhaust steam or other medium to the water. Standard heating elements are designed for working steam pressures to 125 lbs. per square inch.

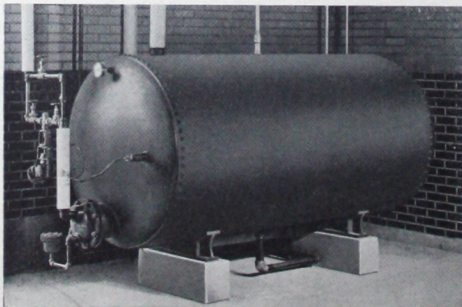
Any desired combination of storage and heating element capacity can be furnished. Tables of available sizes of tanks and heating elements are given on subsequent pages together with the construction features and other data.

For guidance in determining the capacity of a water heater required for any given set of conditions, a recognized method of estimating is given on pages 3 and 4. It must be remembered, however, that it can only serve as a general guide and that consideration must invariably be given to extraordinary or unusual factors.

Typical Example in Selecting the Correct Size of Heater

The information in the following pages is intended as a guide in the selection of the proper size of storage tank, heating element, steam trap and temperature regulator. Complete information is given regarding recommended maximum working pressures, dimensions of tanks, locations of connections and determination of hot water demands.

Problem:—To select the correct size of heater having 900 gallons storage capacity for 100 lbs. working pressure with heating element to heat 600 gallons of water per hour from 40° to 180° F. with steam at atmospheric pressure.



ADSCO Storage Water Heater in a Winery

Example:—Refer to page 8, selecting 48" x 120" tank as having approximately 900 gallons storage capacity. From the heating element capacity table on page 9, select Element No. 120H-2 as the heating element required to heat 600 gallons per hour from 40° to 180° F. The table on page 6 indicates the shell ($\frac{5}{16}$ ") and head ($\frac{1}{2}$ ") thicknesses required for the 48" diameter tank to operate at 100 lbs. pressure. Additional information regarding the heating element, such as sizes of connections, is given on page 9.

Selection of a Steam Trap

Select a steam trap, for use with a storage water heater, of sufficient size to completely drain all condensate during the period of maximum heating and at the lowest pressure under which the trap will be required to operate. The capacity of a trap depends upon the difference between the inlet and outlet pressure. As the differential becomes lower, the capacity decreases, making it necessary to provide for positive drainage of the condensate under such extreme conditions. For this reason it is desirable that the trap should be from two to three times larger than would be required were the maximum steam pressure constantly on the heater. It may be assumed that one pound of steam will be condensed for each gallon of water heated through a temperature range of 120°.

Selection of Temperature Regulator

It is well to base the size of the temperature regulator on the recommendation of the manufacturer who has determined by tests, the size most satisfactory for various loads. In any case the regulator should never be oversized since the most economical and dependable operation can only be secured by proper sizing.

Suggested Specifications

After the proper size storage tank and heating element have been selected, a suitable specification covering the desired details of construction is necessary. We suggest the following, using the typical example given:

One 48" x 120" ADSCO Horizontal Storage Type Water Heater. Tank to be of welded steel plate construction throughout, suitable for 100 lbs. working pressure and factory tested to 150% of that pressure. Provide suitable opening sizes for steam and drip connections. Heating Element (No. 120H-2) to be of the copper U-type with $1\frac{1}{4}$ " O.D. 16 BWG pure deoxidized seamless drawn copper tubes rolled and expanded into a steel tube plate and to have sufficient heating surface to heat 600 gallons of water per hour from 40° to 180° F. with steam at atmospheric pressure.



STORAGE WATER HEATER-HORIZONTAL U-TUBE TYPE

ESTIMATING HOT WATER DEMAND

Reprinted from Chapter 35, of A. S. H. & V. E. Guide 1936

In buildings where the occupancy is doubtful and only the number of plumbing fixtures can serve as a basis for determining the probable hot water demand, the problem is not so simple, owing to the fact that a fixture gives no information as to what service may be demanded from the fixture and this amount of service is really the governing factor in making an estimate of the probable

hot water demand. Table I may prove of some value in this respect as it gives the maximum assumed quantity of hot water per hour which will be demanded of any fixture and then gives a percentage of this amount which may be assumed as probable in different types of buildings. Table II gives approximate hot water requirements in various types of buildings.

TABLE I. Ordinary Maximum Hourly Demand for Hot Water for Various Fixtures in Gallons and Probable Percentage of Usage

Type of Building	Lavatories		Baths	Showers	Slop Sinks	Kitchen Sinks	Pantry Sinks	Foot Baths	Wash Tray	Average Maximum Use*	
	Private	Public									
	Maximum Probable Usage Gallons Per Hour										
	20	20	40	300	30	30	20	20	50		
	Probable Usage in Per Cent of Maximum Ordinary Use										
Apt. House	25%	50%	33%	67%	67%	33%	50%	25%	60%	35%	
Club	25	75	50	67	67	67	100	25	80	60	
Gymnasium	25	100	100	100	...	...	...	100	...	80	
Hospital	25	75	50	33	67	67	100	25	80	45	
Hotel	25	100	50	33	100	67	100	25	80	70	
Industrial	25	150	100	100	67	67	...	100	...	90	
Laundry	25	100	...	...	33	...	...	...	100	100	
Office Bldg.	25	75	...	...	50	...	...	...	...	20	
Public Bath	25	150	150	100	50	...	...	...	...	100	
Residence	25	...	50	33	50	33	50	50	60	50	
School	25	75	...	100	67	33	100	50	...	25	
Y M C A	25	100	100	100	67	67	100	100	80	75	

*Percentage of fixtures likely to be demanding maximum probable usage at any one time.

Example:—Let it be assumed that an apartment house with 20 apartments has 20 baths, 20 lavatories, 20 kitchen sinks and 20 laundry trays; what is the probable maximum hourly demand for hot water?

20 Baths at 40 gal. and 33 per cent...	270 gal.
20 Lava. at 20 gal. and 25 per cent...	100 "
20 Sinks at 30 gal. and 33 per cent...	200 "
20 Trays at 50 gal. and 60 per cent...	600 "
Total	1170 gal.
Probable peak use at one time.....	35 percent
Probable actual peak demand	409 gph.

The total water consumption per person usually varies between 100 and 150 gal. per day when laundry and culinary operations for the occupants are carried out on the same premises. The maximum hourly demand under these conditions will be found to be about one-tenth of the average daily consumption. If one-third of the total water used is hot water and 125 gal. per day is assumed as a fair average of consumption per person, it is apparent that each person

uses about 40 gal. of hot water per day. If one-tenth of this represents the peak hourly load, then 4 gph. must be allowed per person for the heaviest demand. If the average occupancy of apartments is 3 persons, the peak hour demand per apartment will be about 12 gph. It is customary to allow 10 gph. of heating capacity per apartment. Water in excess of this heating capacity drawn out during the peak hours is provided for by storage in the hot water tank and this water is heated during hours when the demand is below the average.

If three persons are assumed to an apartment the total daily use of hot water should approximate

$$20 \times 3 \times 40 \text{ gal., or } = 2400 \text{ gal.}$$

and if the peak hour is 10 per cent of this amount the peak hour by this method shows a probable demand of one-tenth of 2400 gal. which indicates that the values in Table I are safe.

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TABLE II. Hot Water Consumption in Various Types of Buildings for Different Purposes

Type of Building	Conditions	Gallons
Hotels	Room with basin only	10 (per day)
	Room with bath	
	(Transient)	40 (per day)
	(Men)	40 (per day)
	(Mixed)	60 (per day)
	(Women)	80 (per day)
Public Buildings	Two-room suite and bath	80 (per day)
	Three-room suite and bath	100 (per day)
	Public Bath or Lavatory	150 (per day per fixture)
	Public Shower	200 (per day per fixture)
Industrial Buildings	Public Lavatory with Attendant	200 (per day per fixture)
	Per Office Employee	2 (per day)
	Per Factory Employee	5 (per day)
	Cleaning Floors	3 (per 1000 sq. ft. per day)

AMOUNT OF STORAGE REQUIRED

The amount of storage provided in the hot water tank or heater is somewhat a matter of choice but is usually made ample to carry over the peak shortage which is likely to occur and is based on the assumption that only 75 per cent of the storage capacity will be available as it has been found that if more than this amount is withdrawn from storage, the tank is so cooled down as to make the balance useless. The general rule may be cited that the less the heating capacity the greater must be the storage, and the greater the storage the less may be the heating capacity down to a point where the heating capacity will fail to be sufficient to heat up the tank storage during the periods of small load.

Example:—A heater to supply 500 persons will have an average daily use of about

$$500 \times 40 \text{ gal., or } 20,000 \text{ gal.}$$

and this is an average of

$$\frac{20,000 \text{ gal.}}{24} \text{ or } 833 \text{ gph.}$$

but the peak hour will require

$$1/10 \text{ of } 20,000, \text{ or } 2,000 \text{ gal.}$$

and the shortage during the peak hour, if the heating capacity is made to suit the average hourly use of 833 gal. will be

$$2,000 - 833 \text{ or } 1167 \text{ gal.}$$

so that the storage capacity, based on 75 per cent being available from this capacity without cooling the tank excessively, will be

$$\frac{1167}{0.75} \text{ or } 1556 \text{ gal.}$$

Should it be desired to reduce the size of the storage tank and to use a greater heating capacity, it is only necessary to increase the heating capacity to say 1200 gph. which then gives

$$2,000 - 1200 \text{ or } 800 \text{ gal.}$$

as the shortage during the peak hour and the necessary storage will be

$$\frac{800 \text{ gal.}}{0.75} \text{ or } 1067 \text{ gal.}$$

or the heating capacity can be increased to 1500 gal., leaving a shortage of

$$2,000 - 1500 \text{ or } 500 \text{ gal.}$$

and the storage required only

$$\frac{500}{0.75} \text{ or } 667 \text{ gal.}$$

Good design requires that the heating capacity be made as small as possible without introducing undesirable amounts of storage as the heating capacity directly determines the load on the source of heat.

As indicated in Example, the heating load is proportional to the heating capacity and the boiler capacity must be increased for higher heating capacities and may be reduced for smaller heating capacities with greater storage. It may be assumed that a boiler capacity of about $3\frac{1}{2}$ sq. ft.* of equivalent steam heating surface (radiation) must be provided for every gallon of water heated 100 deg., or from 50° F. to 150° F., which is the temperature rise most commonly assumed and required. On this basis it will be seen that the various conditions cited in Example will require additional boiler capacity as follows:

Heating Capacity (GPH)	Additional Boiler Capacity (Sq. Ft. E.D.R.)
833	2916
1200	4200
1500	5250

From this it is apparent that it is less costly to provide ample storage and to reduce boiler capacity than to diminish the storage and supply a greatly increased boiler capacity to compensate.

*Actual requirement for 100 deg. temperature difference:

$$\frac{100 \times 8.33}{240} = 3.33 \text{ sq. ft. per gallon of water heated.}$$



STORAGE WATER HEATER-HORIZONTAL U-TUBE TYPE CONSTRUCTION OF TANKS



Exterior view of Riveted Storage Heater with Flanged Head

General Construction

All ADSCO Storage Water Heater Tanks are fabricated from open hearth steel plate with the shell thicknesses based on a safety factor of 5 as recommended under the A.S.M.E. Code for Unfired Pressure Vessels.

All storage tanks are factory tested at 150% of the working pressure for which they are designed.

Welded or Riveted Tanks

The tanks are furnished of riveted, welded or other construction as specified. Numerous tests have proved that the welded joints are stronger than the plates and with more than two decades of experience in welding pressure joints, the welded construction is recommended. All welded tanks are made with butt type longitudinal joints for all pressures. Circumferential joints are either butt or lap type.

Tank heads are made with a driving fit unless a circumferential butt joint is specified, in which case both head and shell have the same outside diameter. Heads concave to pressure are furnished in both ends of all tanks except in the case of riveted tanks having handholes, in which case one head is convex to pressure.

Manhole openings 11" x 15" are provided in tanks 24" in diameter and larger. Hand-hole openings 4" x 6" are provided in tanks 20" in diameter and smaller.

Element Nozzle, Connections

The heating element nozzle is welded to the inside and outside of the tank head.

All piping connections to the tank are heavily reinforced and welded to the inside and outside of the tank.

Special Heaters Available

The tables on pages 7 and 8 show standard tank sizes, with allowable working pressures on page 6.

However, ADSCO Storage Water Heaters can be furnished for any required working pressure or for any combination of tank and element sizes.

They can be furnished also in the Vertical Type or with more than one heating element if required. They can be supplied in various materials other than standard steel plate, such as Everdur, Toncan Iron, Nickle clad steel, etc.

Prices on heaters of special construction will be quoted upon receipt of complete information regarding service requirements.

PARTIAL LIST OF USERS—ADSCO STORAGE WATER HEATERS

Cherokee Indian School, Cherokee, N. C.
Standard Silicate Co., Inc., Lockport, N. Y.
Orphans Home, Binghamton, N. Y.
Pittsburgh Plate Glass Co., Barberton, O.
Charlotte High School, Charlotte, Mich.
U. S. Veterans Hospital, Yankton, S. D.
New Miami School, New Miami, O.
Supreme Court Bldg., Cheyenne, Wyo.
American Woolen Co., Louisville, Ky.
Beckett Paper Co., Hamilton, O.

West Valley School, West Valley, N. Y.
Kings Park State Hospital, Kings Park, N. Y.
Pittsburgh Coal Co., Douglass, Pa.
Pittsburgh Steamship Co., Cleveland, O.
Union College, Schenectady, N. Y.
Ward Baking Co., New York, N. Y.
Bucknell University, Lewisburg, Pa.
Weston State Hospital, Weston, W. Va.
Pepperell Mfg. Co., Boston, Mass.
U. S. Veterans Hospital, Roanoke, Va.

STORAGE WATER HEATER-HORIZONTAL U-TUBE TYPE MAXIMUM ALLOWABLE WORKING PRESSURES-STORAGE HEATER TANKS

SHELL THICKNESS BASED ON A.S.M.E. RULES WITH A SAFETY FACTOR OF FIVE

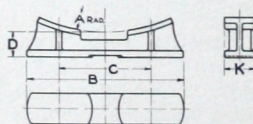
Tank Diam. in Inches	Thickness of Shell and Heads—Inches								Longitudinal Seam
	Shell	Head	Shell	Head	Shell	Head	Shell	Head	
	$\frac{1}{4} \times \frac{3}{8}$	$\frac{5}{16} \times \frac{1}{2}$	$\frac{3}{8} \times \frac{1}{2}$	$\frac{7}{16} \times \frac{9}{16}$	$\frac{1}{2} \times \frac{5}{8}$	$\frac{9}{16} \times \frac{11}{16}$	$\frac{5}{8} \times \frac{3}{4}$		
Working Pressure in pounds per square inch gauge									
18"	187	228							Single Riveted Lap Joint
20"	168	205	241						
24"	140	171	201	231					
30"	129	160	191	221	252				Double Riveted Lap Joint
36"	107	133	159	185	211				
42"	92	115	137	158	181				
48"	81	100	120	138	158				
54"	72	89	107	123	141				
60"	64	80	96	111	127				
72"	54	67	80	93	106				
84"		57	69	79	91				
96"			60	69	79				
42"	110	136	163	188	215	240			Double Riveted Double Strapped Butt Joint
48"	96	119	142	165	188	211			
54"	85	106	127	147	167	187			
60"	77	95	114	137	151	169	187		
72"	64	79	95	114	126	141	156		
84"		68	81	94	108	121	134		
96"			71	82	94	106	117		
72"	68	85	103	119	137	151	167		Triple Riveted Double Strapped Butt Joint
84"	58	73	88	102	117	129	144		
96"		63	77	89	102	113	126		

STORAGE TANK CRADLES - Dimensions and Approx. Weights

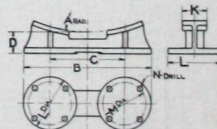
ADSCO Cradles or supports for storage water heaters are semi-steel castings of heavy construction. Standard type cradles are regularly furnished with all horizontal heaters unless pipe leg type cradles are

specified. The pipe leg type cradle is similar to the standard type except that it is drilled on the bottom for bolting to standard companion flanges.

STANDARD TYPE CRADLE



PIPE LEG TYPE CRADLE

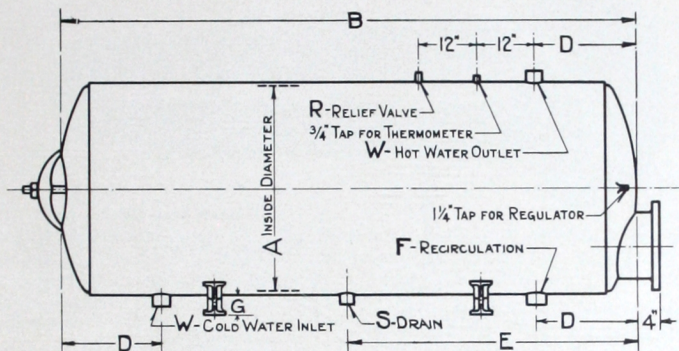


Diam. of Tank	A	B	C	D	K	Wgt. each (lbs.)
20	10 $\frac{1}{4}$	12	7	3	3	10
24	12 $\frac{1}{4}$	15	8	3	3	13
30	15 $\frac{3}{8}$	18	8	3	3 $\frac{1}{2}$	17
36	18 $\frac{3}{8}$	21	10 $\frac{1}{2}$	3	3 $\frac{1}{2}$	23
42	21 $\frac{1}{2}$	24	12	4	4	36
48	24 $\frac{1}{2}$	24	15	4	4 $\frac{1}{2}$	42
54	27 $\frac{1}{2}$	27	18	4	4 $\frac{1}{2}$	55
60	30 $\frac{1}{2}$	30	19	4	6	70
72	36 $\frac{1}{2}$	36	25	4	6	85
84	42 $\frac{1}{2}$	42	31	4	6	120
96	48 $\frac{1}{2}$	48	37	4	6	150

Diam. of Tank	A	B	C	D	K	L	M	N	Pipe Size of Flange	Wgt. each (lbs.)
20	10 $\frac{1}{4}$	12	7	3	3	5	3 $\frac{3}{8}$	$\frac{5}{8}$	1 $\frac{1}{2}$	13
24	12 $\frac{1}{4}$	15	8	3	3	7	5 $\frac{1}{2}$	$\frac{3}{4}$	2 $\frac{1}{2}$	18
30	15 $\frac{3}{8}$	18	8	3	3 $\frac{1}{2}$	7	5 $\frac{1}{2}$	$\frac{3}{4}$	2 $\frac{1}{2}$	23
36	18 $\frac{3}{8}$	21	10 $\frac{1}{2}$	3	3 $\frac{1}{2}$	7 $\frac{1}{2}$	6	$\frac{3}{4}$	3	31
42	21 $\frac{1}{2}$	24	12	4	4	9	7 $\frac{1}{2}$	$\frac{3}{4}$	4	40
48	24 $\frac{1}{2}$	24	15	4	4 $\frac{1}{2}$	9	7 $\frac{1}{2}$	$\frac{3}{4}$	4	47
54	27 $\frac{1}{2}$	27	18	4	4 $\frac{1}{2}$	9	7 $\frac{1}{2}$	$\frac{3}{4}$	4	60
60	30 $\frac{1}{2}$	30	19	4	6	11	9 $\frac{1}{2}$	$\frac{7}{8}$	6	95
72	36 $\frac{1}{2}$	36	25	4	6	11	9 $\frac{1}{2}$	$\frac{7}{8}$	6	105
84	42 $\frac{1}{2}$	42	31	4	6	11	9 $\frac{1}{2}$	$\frac{7}{8}$	6	140
96	48 $\frac{1}{2}$	48	37	4	6	11	9 $\frac{1}{2}$	$\frac{7}{8}$	6	170

STORAGE WATER HEATER - HORIZONTAL U-TUBE TYPE

STORAGE TANKS—STANDARD SIZES



SIZES, CAPACITIES, DIMENSIONS AND CONNECTIONS

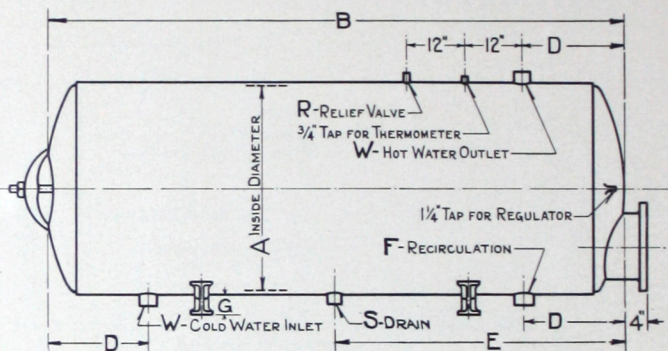
Tank Size Inches	Storage Capacity Gallons	A	B	D	E	F	G	R	S	W
18 x 48	50	18	48	11	24	1	3	3/4	1	1 1/4
18 x 60	65	18	60	11	30	1	3	3/4	1	1 1/4
18 x 72	80	18	72	11	36	1	3	3/4	1	1 1/4
20 x 48	65	20	48	11	24	1	3	3/4	1	1 1/4
20 x 60	80	20	60	11	30	1	3	3/4	1	1 1/4
24 x 48	94	24	48	12	24	1 1/4	3	3/4	1 1/4	1 1/4
24 x 60	118	24	60	12	30	1 1/4	3	3/4	1 1/4	1 1/4
24 x 72	141	24	72	12	36	1 1/4	3	3/4	1 1/4	1 1/4
24 x 84	164	24	84	12	42	1 1/4	3	3/4	1 1/4	1 1/4
30 x 60	185	30	60	15	30	1 1/4	3	3/4	1 1/4	2
30 x 72	220	30	72	15	36	1 1/4	3	3/4	1 1/4	2
30 x 84	255	30	84	15	42	1 1/4	3	3/4	1 1/4	2
30 x 96	290	30	96	15	48	1 1/4	3	3/4	1 1/4	2
30 x 108	330	30	108	15	54	1 1/4	3	3/4	1 1/4	2
30 x 120	360	30	120	15	60	1 1/4	3	3/4	1 1/4	2
36 x 60	265	36	60	16	30	1 1/2	3	1	1 1/2	2
36 x 72	315	36	72	16	36	1 1/2	3	1	1 1/2	2
36 x 84	365	36	84	16	42	1 1/2	3	1	1 1/2	2
36 x 96	420	36	96	16	48	1 1/2	3	1	1 1/2	2
36 x 108	475	36	108	16	54	1 1/2	3	1	1 1/2	2
36 x 120	525	36	120	16	60	1 1/2	3	1	1 1/2	2
36 x 132	580	36	132	16	66	1 1/2	3	1	1 1/2	2
36 x 144	640	36	144	16	72	1 1/2	3	1	1 1/2	2
42 x 72	430	42	72	19	36	2	4	1 1/4	2	3
42 x 84	500	42	84	19	42	2	4	1 1/4	2	3

All dimensions in inches.

Handholes 4" x 6" in Tanks 20" in diameter and smaller. Manholes 11" x 15" in Tanks 24" in diameter and larger.

STORAGE WATER HEATER - HORIZONTAL U-TUBE TYPE

STORAGE TANKS—STANDARD SIZES



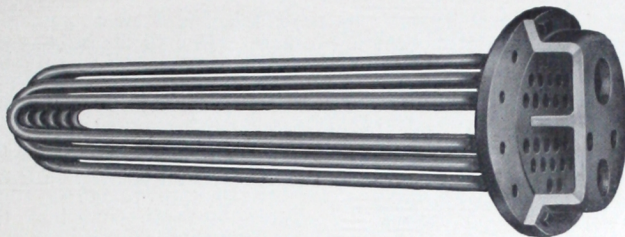
SIZES, CAPACITIES, DIMENSIONS AND CONNECTIONS

Tank Size Inches	Storage Capacity Gallons	A	B	D	E	F	G	R	S	W
42 x 96	575	42	96	19	48	2	4	1 1/4	2	3
42 x 108	650	42	108	19	54	2	4	1 1/4	2	3
42 x 120	720	42	120	19	60	2	4	1 1/4	2	3
42 x 132	790	42	132	19	66	2	4	1 1/4	2	3
42 x 144	860	42	144	19	72	2	4	1 1/4	2	3
42 x 156	935	42	156	19	78	2	4	1 1/4	2	3
42 x 168	1000	42	168	19	84	2	4	1 1/4	2	3
48 x 96	750	48	96	20	48	2	4	1 1/4	2	4
48 x 108	845	48	108	20	54	2	4	1 1/4	2	4
48 x 120	950	48	120	20	60	2	4	1 1/4	2	4
48 x 132	1035	48	132	20	66	2	4	1 1/4	2	4
48 x 144	1140	48	144	20	72	2	4	1 1/4	2	4
48 x 156	1250	48	156	20	78	2	4	1 1/4	2	4
48 x 168	1310	48	168	20	84	2	4	1 1/4	2	4
54 x 120	1190	54	120	23	60	2	4	1 1/2	2	4
54 x 144	1430	54	144	23	72	2	4	1 1/2	2	4
54 x 168	1670	54	168	23	84	2	4	1 1/2	2	4
60 x 120	1420	60	120	24	60	3	4	1 1/2	3	4
60 x 144	1710	60	144	24	72	3	4	1 1/2	3	4
60 x 168	2000	60	168	24	84	3	4	1 1/2	3	4
72 x 144	2460	72	144	25	72	4	4	1 1/2	3	6
72 x 168	2880	72	168	25	84	4	4	1 1/2	3	6
84 x 144	3320	84	144	26	72	4	4	2	4	6
84 x 168	3900	84	168	26	84	4	4	2	4	6
96 x 168	5070	96	168	28	84	4	4	2	4	6

All dimensions in inches.

Handholes 4" x 6" in Tanks 20" in diameter and smaller. Manholes 11" x 15" in Tanks 24" in diameter and larger.

STORAGE WATER HEATER-HORIZONTAL U-TUBE TYPE U-TUBE HEATER ELEMENT



The Water Heater Element is of the U-tube type which allows for unequal expansion due to variations in the temperature. Each tube can expand fully and independently of all others.

The tubes are made of 1 1/4" O.D. 16 BWG (.065" wall) pure deoxidized seamless drawn copper, formed to U-shape of the proper radius by a special forming process which retains the original section free from kinks and metal strain. The ends of the tubes are rolled and expanded into a steel tube plate and will remain tight permanently. The holes in the tube plate are drilled and reamed to fit the tubes.

The heating element support is drilled for each individual tube and all holes are reamed

with sufficient clearance to allow for independent expansion and contraction of the tubes without binding or strain.

All supports are securely fastened to the tank and hold the tubes in proper position.

The element is suitable for a working steam pressure of 125 lbs. per square inch and is hydrostatically tested to 150% of working pressure. The copper tubes are mill tested at 1000 lbs. pressure per square inch.

The capacity limit obtainable with each element is stated and any lesser capacity may be provided by varying the amount of heating surface. In designating any element listed, state the element number, capacity desired in gallons per hour, temperature range and steam pressure.

HEATER ELEMENT CAPACITIES, DIMENSIONS AND CONNECTIONS

*Heating Element Number	Max. GPH 40° to 180° F. Steam at 0 lbs.	Smallest Std. Tank Element will fit	†Maximum Connections		*Heating Element Number	Max GPH 40° to 180° F. Steam at 0 lbs.	Smallest Std. Tank Element will fit	†Maximum Connections	
			Inlet	Outlet				Inlet	Outlet
48H-1	110	18 x 48	2	2	108H-1	260	30 x 108	2	2
48H-2	260	18 x 48	3	3	108H-2	600	30 x 108	3	3
48H-3	500	20 x 48	4	4	108H-3	1120	30 x 108	4	4
					108H-4	1560	30 x 108	5	5
60H-1	140	18 x 60	2	2	108H-5	2420	30 x 108	6	6
60H-2	340	18 x 60	3	3	108H-6	3720	36 x 108	8	8
60H-3	620	20 x 60	4	4	108H-7	5540	42x 108	8	8
60H-4	850	24 x 60	5	5					
					120H-1	290	30 x 120	2	2
72H-1	170	18 x 72	2	2	120H-2	680	30 x 120	3	3
72H-2	400	18 x 72	3	3	120H-3	1260	30 x 120	4	4
72H-3	750	20 x 72	4	4	120H-4	1740	30 x 120	5	5
					120H-5	2700	30 x 120	6	6
84H-1	200	24 x 84	2	2	120H-6	4140	36 x 120	8	8
84H-2	470	24 x 84	3	3	120H-7	6160	42 x 120	8	8
84H-3	870	24 x 84	4	4					
84H-4	1200	24 x 84	5	5	132H-1	320	36 x 132	2	2
84H-5	1880	30 x 84	6	6	132H-2	750	36 x 132	3	3
					132H-3	1400	36 x 132	4	4
96H-1	230	30 x 96	2	2	132H-4	1920	36 x 132	5	5
96H-2	540	30 x 96	3	3	132H-5	3270	36 x 132	6	6
96H-3	1000	30 x 96	4	4	132H-6	5000	36 x 132	8	8
96H-4	1380	30 x 96	5	5	132H-7	6800	42 x 132	8	8
96H-5	2140	30 x 96	6	6					
96H-6	3300	36 x 96	8	8	†Steam and drip connections as furnished will be determined from actual operating conditions.				
96H-7	4900	42 x 96	8	8					

*Number designates Element length and Head size, i.e. No. 48H-1 is 48" long and No. 1 Head is used. In addition to element number, state capacity, temperature range desired and steam pressure to be used.



STORAGE WATER HEATER-HORIZONTAL U-TUBE TYPE

DETERMINING ELEMENT CAPACITY—VARIOUS TEMPERATURES, PRESSURES

The heating element capacity table on page 9 is based on a temperature rise from 40° to 180° F. with steam at atmospheric pressure. Through the use of that table and the factor table below it is possible to determine capacities or select required elements in other pressure and temperature ranges.

To Determine Capacity of elements at higher steam pressures and other temperature ranges, multiply capacities shown on page 9 by factor from the table below.

Example No. 1:—To determine capacity of element 48H-1 for temperature rise of 40° to 160° F., steam at 5 lbs. pressure. The factor, from table below, for these conditions is 1.75.

Maximum Capacity, Element 48H-1 = 110 × 1.75 = 192½ Gal. per hr.

Therefore, the capacity of Element 48H-1 for 40° to 160° F., steam at 5 lbs. pressure is 192½ gallons per hour.

To Select an Element required for a desired capacity with steam at other than atmospheric pressure or temperature range other than 40° to 180° F., divide desired capacity by factor from table below and select element from capacity ranges listed on page 9. Use element of maximum length for tank.

Example No. 2:—To determine heating element for 700 gallons per hour, temperature rise 40° to 160° F., steam at 10 lbs. pressure, to be installed in a tank 84" long. The factor for these conditions is 2.285. Divide 700 by factor 2.285 = 306 gallons per hour. From page 9 select an element 84" long with 306 gallons capacity, which is No. 84H-2. Specify Element No. 84H-2, to heat 700 gallons per hour, 40° to 160° F., steam at 10 lbs. pressure.

CONVERSION FACTORS FOR VARIOUS TEMPERATURES AND PRESSURES

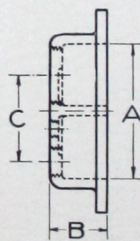
Temp. From	Rise to	Steam Pressure in Pounds Gauge											
		0	2	5	10	15	20	25	30	40	50	100	125
40°	100°	3.86	4.04	4.65	5.87	6.24	6.52	7.80	8.10	8.65	9.16	10.8	11.2
	110°	3.17	3.31	3.83	4.86	5.18	5.46	6.53	6.71	7.23	7.57	8.94	9.42
	120°	2.63	2.78	3.21	4.10	4.35	4.60	5.52	5.73	6.13	6.45	7.68	8.20
	130°	2.22	2.35	2.73	3.51	3.76	3.96	4.74	4.92	5.29	5.43	6.72	7.13
	140°	1.89	2.00	2.35	3.01	3.25	3.45	4.13	4.29	4.62	4.91	5.87	6.23
	150°	1.61	1.72	2.02	2.62	2.83	3.01	3.62	3.77	4.08	4.34	5.20	5.56
	160°	1.37	1.48	1.75	2.285	2.48	2.63	3.20	3.34	3.61	3.84	4.65	4.98
	170°	1.17	1.27	1.51	1.985	2.17	2.33	2.83	2.94	3.21	3.42	4.18	4.46
	180°	1.00	1.075	1.30	1.74	1.91	2.05	2.50	2.63	2.87	3.06	3.77	4.05

HEADS FOR HEATING ELEMENTS—SIZES AND DIMENSIONS

The steam heads in ADSCO Storage Water Heaters are semi-steel castings designed for 125 lbs. working steam pressure and all tappings or flanges are 125 lbs. A.S.M.E. Standard. Two types of heads are available—one with screw inlet and outlet connections and one with flanged inlet and outlet connections. The head with screwed connections is regularly furnished when the inlet connection size does not exceed four inches. The head with flanged connections is furnished when an inlet connection size of five inches or larger is required or when flanged connections not smaller than two inches are specified.

The flanged heads permit removal of the element without disturbing the piping.

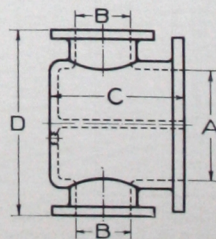
Both types are tapped with ½" openings for the air vent.



Heads - Screwed Connections

Size	A	B	*C	Maximum Connections	
				Outlet	Inlet
1-S	6	3	3 ⁷ / ₁₆	2	2
2-S	8	3	4 ³ / ₈	3	3
3-S	10	3 ³ / ₄	5 ³ / ₈	4	4

*Center to center for maximum inlet and outlet connections. Smaller connections if desired.



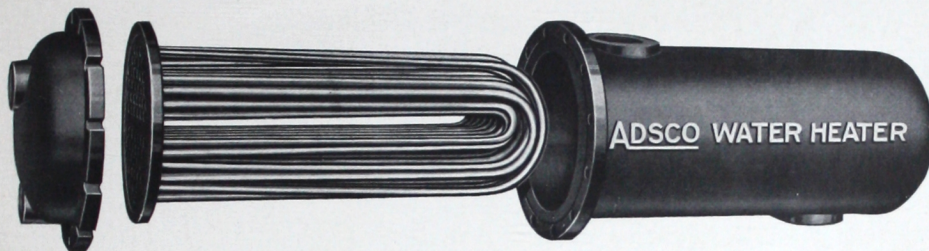
Heads - Flanged Connections

Size	A	*B	C	D
1-F	6	3	10 ¹ / ₂	12
2-F	8	4	12 ¹ / ₂	14 ¹ / ₂
3-F	10	5	13 ³ / ₁₆	17
4-F	12	6	14 ⁷ / ₁₆	20
5-F	14 ¹ / ₄	8	17 ¹ / ₈	23 ¹ / ₄
6-F	17 ¹ / ₄	8	17 ³ / ₈	26
7-F	20	8	17 ⁹ / ₁₆	28 ¹ / ₂

*Maximum inlet and outlet connections.

COPPER U-TUBE WATER HEATER

INSTANTANEOUS TYPE or GRAVITY RECIRCULATING TYPE



Type E Heater

The ADSCO Water Heater is designed to handle the hot water requirements in industrial plants, office buildings, apartments, hospitals, hotels, railroads, colleges and institutions.

A VARIETY OF APPLICATIONS

It can be supplied with suitable heating surface and openings for a variety of operating conditions, as follows:

1. Heating of water by steam for constant flow or in connection with a storage water tank — either instantaneous type or gravity recirculating type.
2. Converter service, using steam from a district steam heating plant or other source to operate a hot water heating system.
3. The cooling of hot condensate by means of cold water to reclaim the heat available or to lower the condensate temperature to a permissible point for draining to a sewer.
4. Booster heater service, where a por-

tion of the water must be supplied at a higher temperature than the main supply.

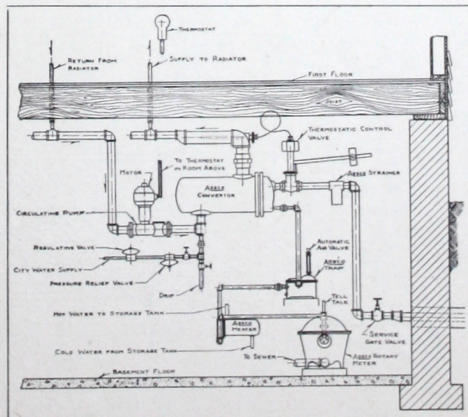
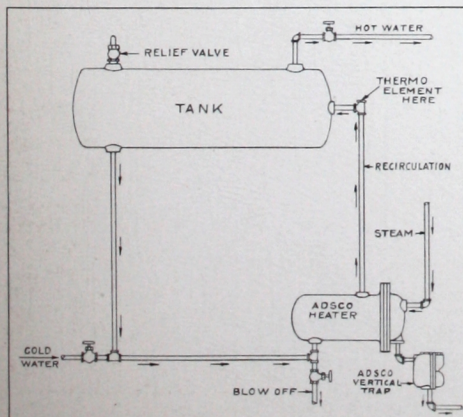
5. The heating or cooling of fluids by steam, water or other mediums in industrial process work.

6. Heating of fuel oil in connection with boilers and industrial furnace operations.

CONSTRUCTION

The ADSCO Type E Water Heater is extremely simple in design, efficient in operation, easy to clean and is constructed of high grade materials throughout. It permits of free and rapid circulation and lends itself to automatic temperature control. The heating surface is seamless drawn copper tubing, U-tube type, expanded into a steel tube plate — an arrangement that is entirely free from strain due to expansion and contraction. The heater shell and head are of steel or semi-steel, according to the size and service required. Semi-steel saddles for mounting the larger sizes can be furnished, if desired.

TYPICAL INSTALLATIONS OF THE ADSCO WATER HEATER





COPPER U-TUBE WATER HEATER

INSTANTANEOUS TYPE or GRAVITY RECIRCULATING TYPE

AVAILABLE IN ANY CAPACITY

The ADSCO Water Heater is available in a number of types and in any desired capacity to meet any temperature range or operating condition. ADSCO engineers will

be pleased to offer definite recommendations in connection with any water heater requirement.

The tabulations below give capacities frequently desired, together with dimensions, weights and list prices.

DIMENSIONS, CAPACITIES AND LIST PRICES
TABLE No. 1—STEAM IN TUBES, WATER IN SHELL

Size	WATER HEATING CAPACITIES Gals. per Hr.—40°—180° F.					†OPENING SIZES			OVERALL DIMENSIONS		Weight, lbs.	List Price
	Atmospheric	1 lb.	2 lbs.	5 lbs.	10 lbs.	Water	Drip	Max. Steam Openings	Diam.	Length		
1	20	21	22	25	28	1"	1"	1"	6 ⁷ / ₁₆	14 ⁵ / ₈	25	\$ 16.50
2	40	42	44	50	56	1	1	1	7 ¹ / ₂	14 ⁵ / ₈	30	22.00
3	68	71	74	83	94	1 ¹ / ₂	3 ³ / ₄	1 ¹ / ₄	12 ³ / ₈	20 ¹ / ₈	110	68.00
4	100	105	109	122	139	2	3 ³ / ₄	1 ¹ / ₄	12 ³ / ₈	21 ⁷ / ₈	125	80.00
5	160	167	175	195	222	3	1	2	14 ¹ / ₂	24	210	105.00
6	200	209	218	244	277	3	1	2	14 ¹ / ₂	24	220	115.00
7	250	262	273	305	346	3 ¹ / ₂	1	2	14 ¹ / ₂	31 ¹ / ₂	240	125.00
8	310	324	338	378	430	3 ¹ / ₂	1	2	14 ¹ / ₂	31 ¹ / ₂	265	135.00
9	420	440	458	512	582	3 ¹ / ₂	1	2	14 ¹ / ₂	39 ¹ / ₂	295	150.00
10	520	545	566	635	720	4	1 ¹ / ₄	3	19 ¹ / ₄	34 ³ / ₄	505	210.00
11	590	616	645	720	820	4	1 ¹ / ₄	3	19 ¹ / ₄	34 ³ / ₄	510	240.00
12	690	720	752	842	956	4	1 ¹ / ₄	3	19 ¹ / ₄	42 ³ / ₄	580	250.00
13	780	815	850	952	1080	4	1 ¹ / ₄	3	19 ¹ / ₄	42 ³ / ₄	590	270.00
14	895	935	975	1090	1240	4	1 ¹ / ₄	3	19 ¹ / ₄	52 ³ / ₄	700	300.00
15	1010	1060	1110	1235	1400	4	1 ¹ / ₄	3	19 ¹ / ₄	52 ³ / ₄	710	320.00
16	1240	1300	1360	1515	1720	5	1 ¹ / ₂	6	28 ¹ / ₄	43 ¹ / ₂	1430	*
17	1390	1450	1525	1700	1930	5	1 ¹ / ₂	6	28 ¹ / ₄	43 ¹ / ₂	1500	*
18	1700	1780	1860	2080	2360	5	1 ¹ / ₂	6	28 ¹ / ₄	50 ¹ / ₂	1640	*
19	2000	2090	2180	2440	2770	5	1 ¹ / ₂	6	28 ¹ / ₄	56 ¹ / ₂	1940	*
20	2540	2640	2770	3100	3520	5	2	6	28 ¹ / ₄	68 ¹ / ₂	2280	*
21	3080	3220	3360	3760	4270	5	2	6	28 ¹ / ₄	80 ¹ / ₂	2350	*

†Actual steam size furnished will be based on service requirements.

*Prices on application.

When heating water 40° to 140° multiply above capacities by 1.8

When heating water 50° to 150° multiply above capacities by 1.7

When heating water 50° to 180° multiply above capacities by 1.04

CAPACITIES AS CONVERTER for Hot Water Heating Systems—*Total Sq. Ft. of Radiation
TABLE No. 2—STEAM IN TUBES, WATER IN SHELL

Size	Water Heated—150° to 180° F.					Water Heated—160° to 180° F./					Water Heated—160° to 190° F.				
	Atmospheric	1 lb.	2 lbs.	5 lbs.	10 lbs.	Atmospheric	1 lb.	2 lbs.	5 lbs.	10 lbs.	Atmospheric	1 lb.	2 lbs.	5 lbs.	10 lbs.
1	68	72	77	91	114	62	66	71	85	107	53	57	62	76	98
2	136	144	154	182	228	124	132	142	170	214	106	114	124	152	196
3	231	245	262	310	388	211	224	242	290	364	180	194	211	258	333
4	340	360	385	445	570	310	330	355	425	535	265	285	310	380	490
5	544	576	616	728	912	496	528	568	680	856	424	456	496	608	784
6	680	720	770	910	1140	620	660	710	850	1070	530	570	620	760	980
7	850	900	962	1138	1425	775	825	887	1062	1340	662	712	775	950	1225
8	1052	1117	1192	1410	1770	960	1022	1100	1320	1660	821	883	960	1180	1520
9	1430	1512	1620	1910	2400	1300	1386	1490	1785	2250	1112	1200	1300	1600	2060
10	1770	1875	2000	2370	2960	1612	1720	1850	2210	2780	1380	1482	1612	1980	2550
11	2010	2125	2270	2690	3360	1830	1950	2100	2510	3160	1565	1680	1830	2240	2900
12	2345	2480	2660	3140	3940	2140	2280	2450	2940	3700	1830	1970	2140	2620	3380
13	2650	2810	3000	3550	4450	2420	2580	2770	3320	4170	2070	2220	2420	2960	3820
14	3040	3220	3450	4070	5100	2780	2960	3180	3800	4800	2370	2550	2780	3400	4380
15	3440	3640	3900	4600	5760	3130	3340	3580	4300	5400	2680	2880	3130	3840	4950

*In calculating total square feet of radiation, area of the mains should be included.

Dimensions, Connections, Weights and List Prices are the same as in Table No. 1 above.



COPPER U-TUBE WATER HEATER

SUBMERGED HEATER TYPE and CONDENSATE COOLER TYPE

SUBMERGED HEATER TYPE

A Submerged Heater is the name commonly applied to a heater operating below the water line of a boiler, using the hot boiler water to heat cold water for domestic hot water supply or for any equivalent service. A Submerged Water Heater may be in the form of a heating element in a standard type storage water heater. Very often it consists of an instantaneous type water heater such as described in this bulletin, mounted alongside the boiler under the water line and circulating the service water by gravity flow to a storage tank. The boiler water flows through the heater shell and the service water through the tubes.

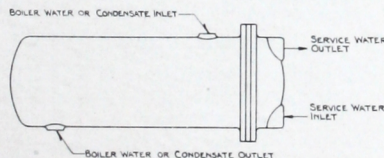
CONDENSATE COOLERS

The purpose of Condensate Coolers, often referred to as Economizers, is to cool hot condensate flowing from steam operated equipment or systems in order to reclaim the heat in the condensate or to reduce its tem-

perature to a point where it may be returned to a hotwell or pump, or discharged to the sewer at a suitable temperature where city ordinances place a definite maximum upon the temperatures of discharged wastes. The cooling is accomplished by passing the condensate through the shell and transferring the heat to water in the tubes or to some other liquid which requires heating. Where heat reclamation is the main consideration, a Condensate Cooler permits of a considerable saving in fuel costs compared to the initial cost of the Cooler. Condensate Coolers are a form of Submerged Heater and the water which is heated is circulated frequently by gravity flow to a storage tank.

TABLE OF CAPACITIES

The Table below gives capacities of the ADSCO Type E Water Heater for a number of standard service conditions in which water is heated either by means of hot boiler water or by means of hot condensate.



DIMENSIONS, CAPACITIES AND LIST PRICES

Table No. 3

Size	SUBMERGED HEATER SERVICE				CONDENSATE COOLING SERVICE		Water Openings		Overall Dimensions		Wgt. lbs.	List Price
	Gal. per Hr. 50-150° Boiler Water 212°	Gal. per Hr. 40-140° Boiler Water 212°	Gal. per Hr. 50-150° Boiler Water 180°	Gal. per Hr. 40-140° Boiler Water 180°	Lbs. per Hr. Condensate Cooled 200°-100°	Gal. per Hr. Water Heated 50°-100°	Shell	Cover	Diam.	L'ngth		
101	13	15	7	8	80	19	1"	1"	6 ⁷ / ₁₆	14 ⁵ / ₈	25	\$16.50
102	26	30	14	16	160	38	1	1	7 ¹ / ₂	14 ⁵ / ₈	30	22.00
103	44	50	23	28	272	65	1 ¹ / ₂	1 ¹ / ₄	12 ³ / ₈	20 ¹ / ₈	110	68.00
104	65	74	34	41	400	96	2	1 ¹ / ₄	12 ³ / ₈	21 ¹ / ₈	125	80.00
105	104	118	54	66	640	154	3	1 ¹ / ₂	14 ¹ / ₂	24	210	105.00
106	130	147	68	82	800	192	3	1 ¹ / ₂	14 ¹ / ₂	24	220	115.00
107	162	184	85	103	1000	240	3 ¹ / ₂	2	14 ¹ / ₂	31 ¹ / ₂	245	125.00
108	202	228	105	128	1240	298	3 ¹ / ₂	2	14 ¹ / ₂	31 ¹ / ₂	265	135.00
109	273	308	143	173	1680	403	3 ¹ / ₂	2	14 ¹ / ₂	39 ¹ / ₂	295	150.00
110	338	382	177	214	2080	500	4	2 ¹ / ₂	19 ¹ / ₄	34 ³ / ₄	505	210.00
111	384	434	200	244	2360	566	4	2 ¹ / ₂	19 ¹ / ₄	34 ³ / ₄	510	240.00
112	448	507	235	284	2760	663	4	2 ¹ / ₂	19 ¹ / ₄	42 ³ / ₄	580	250.00
113	507	573	265	322	3120	750	4	3	19 ¹ / ₄	42 ³ / ₄	590	270.00
114	580	657	304	369	3580	860	4	3	19 ¹ / ₄	52 ³ / ₄	700	300.00
115	656	742	344	416	4040	970	4	3	19 ¹ / ₄	52 ³ / ₄	710	320.00



ADSCO HEAT INTERCHANGE EQUIPMENT

OUTLINE OF TYPES AND APPLICATIONS

HEATERS

WATER SERVICE

Used for domestic service, hot water heating systems, boiler feed, swimming pools, atmospheric conditioning service, maintaining minimum temperature on outdoor water storage tanks and gas holders.

OIL SERVICE

Used with fuel oil systems, road oil distribution and lubricating oil purifying service.

OTHER LIQUIDS, AIR, GASES

Used in process work in connection with sugar juices and other food products, also brines, solvents, creosote, etc. Also used to heat air and gases frequently required in process work.

PRE-HEATERS

Used for preliminary heating of oils and other viscous liquids in storage to facilitate pumping.

COOLERS

Used for handling water, condensate, boiler blowdown, jacket water, brines, food juices, air and other gases, lubricating and quenching oils.

ECONOMIZERS

Used for reclaiming heat from condensate or waste liquids and for heating raw liquids in process work by means of the heat in the finished liquid products ready for cooling.

OTHER TYPES OF SERVICE

Used as Vapor Condensers, After Coolers, Bleeder Heaters and allied heat interchange equipment.

PARTIAL LIST OF USERS—ADSCO WATER HEATERS

Industrial Plants

Aluminum Co. of America
Associated Hosiery Mills, Inc.
Atchison, Topeka & Santa Fe
R. R. Co.
Atlantic Refining Co.
Beckett Paper Co.
Canadian Chromalox Co., Ltd.
Canadian Wineries, Ltd.
Carborundum Company
Carrier Corporation
Chevrolet Motor Co.

Continental Baking Co.
Corning Glass Works
Dupont Rayon Company
Dupont Viscoloid Co., Inc.
Fibre Pulp Corp.
General Plastics, Inc.
Gould Pumps, Inc.
Industrial Rayon Co.
Keith Paper Company
Krebs Pigment & Color Corp.
Linde Air Products Co.

National Carbon Co.
Pennsylvania R. R. Co.
Pittsburgh Coal Co.
Pittsburgh Steamship Co.
Pullman Company
R. & H. Chemical Co.
Standard Silicate Co.
United Shipyards, Inc.
Ward Baking Co.
Westvaco Chlorine Products Co.

Public Utilities

Delaware Co. Central Heating Co.
Eugene Central Heating Co.
Georgia Power Company
Cermantown Steam Company

Illinois Power & Light Corp.
Indianapolis Power & Light Co.
Ohio Edison Company
Overbrook Steam Heat Co.

Owatonna Municipal System
Renova Edison Lt., Ht. & Pr. Co.
St. Joseph Ry., Lt. & Pr. Co.

State and Federal

U. S. Army, Fort Bragg, N. C.
U. S. Army Air Depot, Middletown, Pa.
U. S. Veterans Hospital, Roanoke, Va.
N. Y. State Armory, Ticonderoga, N. Y.
Herkimer Co. Home, Herkimer, N. Y.
Rockland State Hospital, Orangeburg, N. Y.

Tenn. Valley Authority, Knoxville, Tenn.
N. J. State Training School, Vineland, N. J.
Calhoun Co. Hospital, Battle Creek, Mich.
Kings Park State Hospital, Kings Park, N. Y.
U. S. Natl. Bureau of Standards, Washington, D. C.

Colleges, Universities

Bucknell University
Cornell University
Monmouth College
St. Bonaventure College
University of Arizona
University of Dayton
University of Florida
University of Maryland
University of Texas
University of West Virginia
University of Wisconsin

COPPER U-TUBE WATER HEATER

TYPE F GRAVITY RECIRCULATING TYPE FOR USE IN PROTECTING EXPOSED STORAGE TANKS



PROTECTS EXPOSED STORAGE TANKS AGAINST FREEZING

In localities where freezing weather occurs during the year, the ADSCO Type F Water Heater is recommended to provide a suitable water temperature to protect exposed storage tanks from damage due to freezing, particularly those used in connection with fire protection systems.

Detailed information on the requirements for heaters to protect exposed storage tanks in fire protection systems has been prepared by the National Board of Fire Underwriters and the data can be obtained from any fire insurance company.

The essential requirements are reliability and economy in a heater of sufficient capacity to maintain the storage water at not less than 40° F. during the period of lowest atmospheric temperature.

The ADSCO Type F Water Heater is designed to meet the fire underwriters requirements in a steam to water unit suitable for gravity recirculation of the water to provide the necessary heat for the system.

SUITABLE FOR GAS HOLDER TANKS

The ADSCO Type F Water Heater is suitable also for use in connection with tempering the water in gas holder tanks. Where the water may be contaminated by the gas, special materials may be required in the construction of the heater. Give complete information regarding the individual operating conditions for recommendations on suitable materials and quotations on a heater to meet the requirements of the installation.

GENERAL CONSTRUCTION

The ADSCO Type F Water Heater is of copper U-tube construction with water in the shell and steam in the tubes. The tubes are 1¼" OD, 16 BWG copper, comprising a heating element in a steel tube plate that can be removed easily for inspection. The shell is steel and the head is a semi-steel casting. The heater is built for 120 lbs. working steam pressure and is subjected to a hydrostatic test of 300 lbs. in both shell and tube spaces before shipment.

This unit is offered for use on Fire Protection Systems, subject to underwriters approval for the particular installation where it is to be employed.

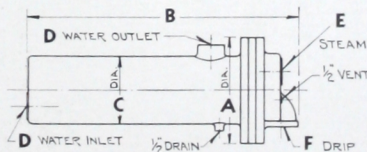


TABLE No. 4—TYPE F HEATER DIMENSIONS, CAPACITIES, WEIGHTS AND LIST PRICES

Size	Dimensions—Inches						*Capacities—B.T.U. per hr. Steam Pressure Gauge					Wgt. lbs.	List Price
	A	B	C	D	E	F	10 lbs.	20 lbs.	30 lbs.	40 lbs.	50 lbs.		
1	10	18½	5⅞	2	1	¾	53,500	60,000	65,200	71,500	75,000	90	\$64.00
2	10	30½	5⅞	2	1	¾	100,000	122,000	133,500	140,000	140,000	110	68.00
3	10	42½	5⅞	2	1	¾	146,500	164,000	178,500	195,500	205,000	130	73.00
4	10	54½	5⅞	2	1	¾	193,000	216,000	235,000	257,500	270,000	150	77.00
5	11	20	6⅞	2	1¼	¾	82,000	92,000	100,000	109,500	115,000	140	80.00
6	11	32	6⅞	2	1¼	¾	154,000	172,000	187,000	205,000	215,000	165	87.00
7	11	44	6⅞	2	1¼	¾	222,000	248,000	270,000	296,000	310,000	190	93.00
8	11	56	6⅞	2	1¼	¾	293,000	328,000	357,000	391,000	410,000	215	100.00
9	13½	22½	8⅞	2	2	¾	204,000	228,000	248,000	272,000	285,000	225	117.00
10	13½	34½	8⅞	2½	2	¾	368,000	412,500	448,000	490,000	515,000	260	130.00
11	13½	46½	8⅞	2½	2	¾	532,000	596,000	648,000	710,000	745,000	300	143.00
12	13½	58½	8⅞	3	2	¾	693,000	776,000	844,000	924,000	970,000	335	158.00
13	16	26	10¾	3	2½	1	325,000	364,000	396,000	433,000	455,000	355	170.00
14	16	38	10¾	3	2½	1	578,000	648,000	705,000	771,000	810,000	410	188.00
15	16	50	10¾	3	2½	1	840,000	940,000	1,020,000	1,120,000	1,175,000	465	208.00
16	16	62	10¾	3	2½	1	1,090,000	1,224,000	1,330,000	1,457,000	1,530,000	520	225.00

*Note—Capacities are listed in B.T.U. per hour when the coldest water is 40° F.



COPPER U-TUBE WATER HEATER

TYPE F GRAVITY RECIRCULATING TYPE FOR USE IN PROTECTING EXPOSED STORAGE TANKS

CAPACITY DATA

Dimensional data, capacities, weights and list prices on the ADSCO Type F Water Heater are given in Table No. 4 on page 5. The capacities are liberal and are based on the B.T.U. transferred per hour for gravity circulation. Special recommendations will be given upon request in the event that forced circulation is used. For any given capacity requirement in B.T.U. per hour, any one of several sizes of the Type F Heater may be chosen from Table No. 4 depending upon the space and steam pressure available at the point of installation.

Table No. 5 below gives the heat loss in B.T.U. per hour for popular sizes of elevated steel and wooden tanks when the temperature of the coldest water is 40° F. in accordance with the basis recommended by the National Board of Fire Underwriters.

HOW TO SELECT THE CORRECT SIZE OF HEATER

Knowing the size of tank, refer to Table No. 5 to learn the heat loss in B.T.U. per hour at the minimum atmospheric temperature recorded for the locality where the heater installation is to be made. Then refer to Table No. 4 to select a size of heater with an equivalent or greater capacity in B.T.U. per hour in accordance with the steam pressure available and space requirements.

EXAMPLE: Select a Type F Water Heater to meet the requirements of a 40,000 gal. elevated steel tank in a locality where the minimum atmospheric temperature is -10° F. and the available steam pressure is 20 lbs.

ANSWER: From Table No. 5 note that the heat loss in B.T.U. per hour for a 40,000 gal. elevated steel tank is 320,000 B.T.U. per hour at -10° F. From Table No. 4 under 20 lbs. steam pressure it may be seen that the No. 8 size Type F Heater with a capacity of 328,000 B.T.U. is suitable for the requirements.

TABLE No. 5. HEAT LOSS IN B.T.U. PER HOUR—ELEVATED TANKS

When Temperature of Coldest Water is 40° F.—Basis Recommended by
National Board of Fire Underwriters

FOR ELEVATED STEEL TANKS

Lowest One-Day Mean Atmospheric Temperature	CAPACITIES OF TANKS—U. S. GALLONS						
	20,000	25,000	30,000	40,000	50,000	75,000	100,000
0°F	160,000	185,000	208,000	249,000	288,000	382,000	460,000
-10	206,000	238,000	268,000	320,000	371,000	490,000	592,000
-20	257,000	296,000	334,000	399,000	462,000	612,000	738,000
-25	284,000	328,000	370,000	442,000	511,000	678,000	816,000
-30	312,000	361,000	406,000	485,000	562,000	744,000	897,000

FOR WOODEN TANKS

Lowest One-Day Mean Atmospheric Temperature	CAPACITIES OF TANKS—U. S. GALLONS						
	20,000	25,000	30,000	40,000	50,000	75,000	100,000
0°F	53,000	62,000	69,000	90,000	106,000	135,000	164,000
-10	69,000	80,000	89,000	116,000	136,000	174,000	211,000
-20	86,000	99,000	111,000	145,000	169,000	217,000	262,000
-25	95,000	110,000	123,000	160,000	188,000	240,000	291,000
-30	104,000	121,000	135,000	176,000	206,000	264,000	319,000